Docket No.: 129545-1
(PATENT)

## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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| In re Application of: | ) | |
| BIN WEI et al. | ) | Group Art Unit 1724 |
| | ) | Confirmation No. 2878 |
| Serial No. 10/708,879 | ) | |
| | ) | Examiner R. Popovics |
| Filed: March 30, 2004 | ) | |
| | ) | |
| For: FLUSHING AND FILTERING SYSTEM FOR ELECTROEROSION MACHINING | ) | Attorney Docket 129545-1 |

**APPEAL BRIEF**

MS Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

As required under § 41.37(a), this brief is filed within two months of the Notice of Appeal filed in this case on April 29, 2010, and is in furtherance of said Notice of Appeal

**Table of Contents**

This Appeal Brief contains items under the following headings as required by 37 C.F.R. § 41.37 and M.P.E.P. § 1205.02:

## I. REAL PARTY IN INTEREST

The real party in interest for this Appeal is:

General Electric Company by way of an Assignment recorded at Reel/Frame 014459/0467 on March 30, 2004.

## II. RELATED APPEALS AND INTERFERENCES

There are no other appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in this Appeal.

## III. STATUS OF CLAIMS

A. Total Number of Claims in Application

There are 22 Claims pending in application.

B. Current Status of Claims

1. Claims canceled: 2 and 14.
2. Claims withdrawn from consideration but not canceled: None.
3. Claims pending: 1, 3-13 and 15-24.
4. Claims allowed: None.
5. Claims rejected: 1, 3-13 and 15-24.

C. Claims On Appeal

The Claims on Appeal are Claims 1, 3-13 and 15-24.

## IV. STATUS OF AMENDMENTS

No amendments to the Claims were filed subsequent to the final Office action dated December 10, 2007. The status of the amendments to the Claims prior to the final Office action is as follows:

A. Responsive to a Restriction Requirement dated June 28, 2006; Appellant provisionally elected Species 2, corresponding to Figure 2, Claims 1-24 on July 17, 2006.

B. Responsive to a non-final Office action dated October 4, 2006; Appellant amended Claims 1, 3, 5, 6, 13, 15, 17 and 18, and canceled Claims 2 and 14 on December 29, 2006.

C. Responsive to a final Office action dated March 22, 2007; Appellant filed a Request For Continued Examination and amended Claims 1 and 13 on May 9, 2007.

D. Responsive to a non-final Office action dated June 27, 2007; Appellant amended Claim 15.

E. Responsive to a final Office action dated December 10, 2007; Appellant timely filed a Notice of Appeal on February 5, 2008 and an Appeal Brief on November 5, 2008.

F. Responsive to a non-final Office action dated February 1, 2010 reopening the prosecution of this application; Appellant timely filed a Notice of Appeal on April 29, 2010.

## V. SUMMARY OF CLAIMED SUBJECT MATTER

Independent Claim 1 is directed to a flushing and filtering system (100) for an electroerosion machine. The system comprises a work tank (102) configured to maintain a workpiece (104) therein; a first filtering stage (116) for roughly filtering residue-containing machining liquid (110) exiting from said work tank (102); a second filtering stage (124) for finely filtering roughly-filtered machining liquid (110) exiting from said first filtering stage (116); a first fluid return path (130) to said work tank (102), said first fluid return path (130) comprising a high-pressure return path for introducing finely-filtered machining fluid through an electrode (106) included in the electroerosion machine; and a second fluid return path (136) to said work tank (102), said second fluid return path (136) introducing said finely-filtered machining fluid (110) through a liquid adding inlet (112) directly connected to said work tank (102). *See Figure 1; Paragraphs [0011]-[0014].*

Independent Claim 13 is directed to a method for flushing and filtering an electroerosion machine, comprising:

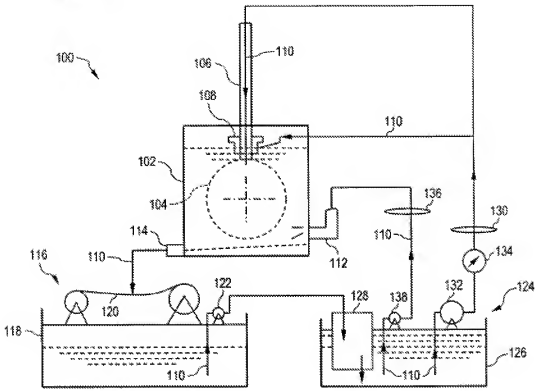
passing a residue-containing machining liquid (110) through a first filtering stage (116) for roughly filtering said residue-containing machining liquid, said residue-containing liquid exiting from a work tank (102) configured to maintain a workpiece (104) therein;

passing roughly-filtered machining liquid exiting from said first filtering stage (116) into a second filtering stage (124) for fine filtering of said roughly-filtered machining liquid (110);

returning finely-filtered machining fluid (110) to said work tank (102) through a first fluid return path (130), said first fluid return path comprising a high-pressure return path for introducing said finely-filtered machining fluid (110) through an electrode (106) included in the electroerosion machine; and

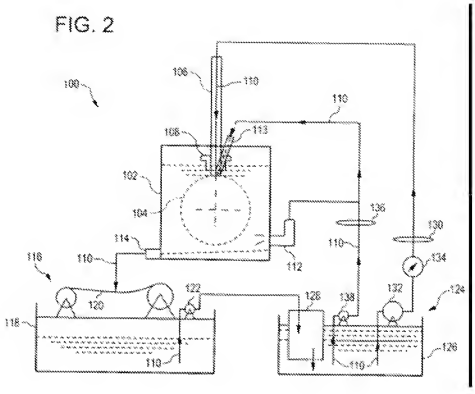
returning said finely-filtered machining fluid (110) to said work tank (102) through a second fluid return path (136), said second fluid return path introducing said finely-filtered machining fluid through a liquid adding inlet (112) directly connected to said work tank (102). *See Figure 1; Paragraphs [0011]-[0015].*

FIG. 1




In addition to being circulated through the electrode center, the machining liquid 110 is also supplied to the guide bush for exterior flushing of contaminants. A liquid adding inlet 112 at the lower portion of the work tank 102 receives machining liquid 110 from a separate input path from that supplying the electrode 106 and guide bush 108, as described in greater detail hereinafter. Sufficient machining liquid 110 is introduced into the work tank 102 to as to maintain the workpiece 104 and guide bush 108 in a substantially submerged condition during the machining process. In an alternative embodiment depicted in Figure 2, a liquid adding outlet/nozzle 113 is configured proximate the top of the work tank 102 for receiving machining liquid 110 and spraying or flushing the machining liquid 110 to the machining area from an up-down or side-to-side direction between the workpiece 104 and electrode 106. In other words, in lieu of being submerged in machining liquid 110, the nozzle may be used to spray the exterior of the guide bush 108 and the workpiece 104. *See Figure 2; Paragraph [0012].*

FIG. 2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**VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL**

1. Whether Claims 1, 3-13 and 15-24 are unpatentable under 35 U.S.C. 103(a) over Abiko (U.S. Patent No. 5,281,788, hereinafter "Abiko") and/or McGregor (U.S. Patent No. 5,045,161, hereinafter "McGregor") and/or Hartwig (U.S. Patent No. 5,177,335, hereinafter "Hartwig) and/or Tanaka (U.S. Patent No. 5,739,497, hereinafter "Tanaka") and/or AAPA (Applicant's Admitted Prior Art).

**VII. ARGUMENT**

1. Rejection of Claims 1, 3-13 and 15-24 under 35 U.S.C. §103(a) over Abiko and/or McGregor and/or Hartwig and/or Tanaka and/or AAPA[1]

Independent Claims 1 and 13 specify, *inter alia*, a flushing and filtering system and method for an electroerosion machine comprising a first fluid return path comprising a high-pressure return path for introducing finely-filtered machining fluid through an electrode included in the electroerosion machine, and a second fluid return path for introducing finely-filtered machining fluid through a liquid adding inlet directly connected to the work tank. (Emphasis added).

Abiko, McGregor and Tanaka disclose typical electroerosion systems in which machining fluid passes through an electrode. See *Fig. 1* of Abiko; *Fig. 1* of McGregor and *Fig. 3* of Tanako.

In the Office action, the Examiner has made several incorrect assertions regarding the prior art. First, on *Page 6* of the Office action, the Examiner asserts that Tanaka discloses a two-stage filtration scheme employing units 126 and 136. Appellant respectfully disagrees with this assertion. Although element 126 is a filter in Tanaka, element 136 is an ion exchange column, not a filter. Therefore, Tanaka does not teach or suggest a two-stage filtration system, as asserted by the Examiner.

Second, the AAPA referred to by the Examiner in the Background Section of the specification is a description of the problems associated with conventional EDM-type filtration and flushing systems. Specifically, *Paragraph [0003]* states that the electroerosion machining process deposits metal chips at the bottom of the working tank, and that without adequate filtration, these deposits can be pumped backed into the machining zone and generate secondary discharge or arcing between the electrode and the workpiece, thereby affecting the stability of the process. *Paragraph [0004]* states that existing EDM-type filtration and flushing systems, such as the type of Hartwig, that are adopted for electroerosion machines do not have sufficient filtration systems associated therewith.

[1] Appellant is confused as to the "and/or" Boolean logic by the Examiner, instead of the acceptable PTO practice in which a rejection under 103 is based on a primary reference "in view of" one or more secondary references. For purposes of this Appeal, Appellant assumes that Abiko, McGregor and AAPA are the primary references, and that Tanaka and Hartwig are the secondary references based on the logic used by the Examiner in the rejection, rather than the thirty-two ($2^5$) different possible combinations of rejections based on Boolean logic.

In no way whatsoever can the AAPA be considered an admission by Appellant that conventional EDM-type (and/or electroerosion) filtration and flushing systems teach or suggest a second fluid return path directly connected to the work tank, as recited in the claimed invention. Rather, the present invention solves precisely the problem associated by existing EDM-type filtration and flushing systems described in the Background Section by including a second fluid return path that introduces finely-filtered machining fluid through an inlet directly connected to the work tank.

The Federal Circuit has expressly held that the TSM-test for obviousness requires a two-part inquiry. The inquiry concerns a motivation to modify or combine, and the second concerns a reasonable expectation of success.

In the aftermath of *KSR*[2], the USPTO issued a set of Guidelines[3] for examining patents, which require the Examiner to identify one or more rationales for alleging *prima facie* obviousness. The list of the rationales is as follows:

(A) Combining prior art elements according to know methods to yield predictable results;

(B) Simple substitution of one known element for another to obtain predictable results;

(C) Use of known technique to improve similar devices (methods, or products) in the same way;

(D) Applying a known technique to a known device (method, or product) ready for improvement to yield predictable results;

(E) "Obvious to try" – choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success;

(F) Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations are predictable to one of ordinary skill in the art;

(G) Some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention.

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[2] *KSR International Co. v. Teleflex Inc.*, 550 U.S. 398 (2007).

[3] Examination Guidelines for Determining Obviousness under 35 U.S.C. 103 In View of the Supreme Court Decision in *KSR International Co. v. Teleflex Inc.*, 72 Fed. Reg. 57,526-57,535.

It is noted that rationale (G) as it occurs in the above list has a confusing error because it discloses only the first prong of the TSM-test, namely, motivation to modify or combine. The complete, error-free, version of rationale (G) occurs later in the Guidelines as follows:

"The rationale to support a conclusion that the claim would have been obvious is that 'a person of ordinary skill in the art would have been motivated to combine the prior art to achieve the claimed invention and that there would have been a reasonable expectation of success.'"[4]

The rationale provided by the Examiner is that the pre-filter of Hartwig will reduce down time associated with conventional filtration schemes. See *Page 7*. It may be true that the pre-filter of Hartwig may reduce down time in EDM machines using water as a machining fluid to wash away swarf, but Appellant asserts that incorporating the pre-filter of Hartwig would actually increase down time in electroerosion machines that use the machining fluid through the spinning electrode.

Specifically, one skilled in the art would clearly understand that the machining fluid being filtered in an electroerosion machine, such as a dielectric, electrolyte, and the like, has substantially different physical properties than the machining fluid, such as water, being filtered in an EDM-type machine. See *Paragraph [0015]*. Thus, the design requirements imposed upon the filtration system in the EDM machine are drastically different than the design requirements in an electroerosion machine. Therefore, one skilled in the art would clearly understand that the filtration system used in EDM machines, which is designed to filter water, would not operate successfully as a filtration system used in electroerosion machines, which is designed to filter a machining fluid with substantially different physical properties. Thus, one skilled in the art would not have a reasonable expectation of success when modifying the electroerosion machines of Abiko, McGregor and Tanako with the pre-filter of the Hartwig EDM machine, contrary to the assertion by the Examiner.

In addition, there is a significant system and operational difference between the electroerosion apparatus and process of the claimed invention and the cited prior art EDM apparatus and process. In the electroerosion apparatus and process of the claimed invention, the hollow electrode spins and feeds. On the other hand, the solid wire electrode in the prior art EDM process only travels linearly. Because of this significant system and operational difference, the electroerosion apparatus and process of the claimed invention uses internal

flushing through the front surface of the hollow electrode to wrap the fluid around the machining zone, while the prior art EDM process uses external flushing in the same direction of wire travel to remove chips outside the machining zone. One skilled in the art would understand this significant system and operational difference between the hollow electrode used in the shaped-tube electrochemical machining (STEM) process of the claimed invention and the solid wire electrode used in the cited prior art EDM apparatus and process. For this additional reason, one skilled in the art would not be motivated to modify the electroerosion machines of Abiko, McGregor and Tanako with the pre-filter of the Hartwig EDM machine.

In view of the foregoing, it is respectfully submitted that the rationale of the Examiner fails at least one prong of the TSM-test, and therefore the Examiner fails to establish a *prima facie* case of obviousness.

For at least this reason, the rejection of Claims 1, 3-13 and 15-24 under 35 U.S.C. 103 is unsupported by the art, so the rejection should be withdrawn.

In view of the foregoing, Appellant respectfully submits that the application is in condition for allowance. Favorable consideration and prompt allowance of the application is earnestly solicited.

Dated: June 18, 2010

Respectfully submitted,

By /Peter J. Rashid/

Peter J. Rashid, Reg. No. 39464

[4] Page 52,534, column 2, lines 16-21, citing *DyStar Textilfarben GmbH & Co. Deutschland KG v. C.H. Patrick Co.*, 464 F.3d 1356, 1360, 80 USPQ2d 1641, 1645 (Fed. Cir. 2006).

## VIII. CLAIMS APPENDIX

1. A flushing and filtering system for an electroerosion machine, comprising:

a work tank configured to maintain a workpiece therein;

a first filtering stage for roughly filtering residue-containing machining liquid exiting from said work tank;

a second filtering stage for finely filtering roughly-filtered machining liquid exiting from said first filtering stage;

a first fluid return path to said work tank, said first fluid return path comprising a high-pressure return path for introducing finely-filtered machining fluid through an electrode included in the electroerosion machine; and

a second fluid return path to said work tank, said second fluid return path introducing said finely-filtered machining fluid through a liquid adding inlet directly connected to said work tank.

3. The flushing and filtering system of claim 1, wherein said first filtering stage further comprises:

a rough filtering device for receiving residue-containing machining liquid exiting from said work tank;

a first filtering tank for holding said roughly-filtered machining liquid passed through said rough filtering device; and

a rough filtering pump for transferring said roughly-filtered machining liquid from said first filtering tank to said second filtering stage.

4. The flushing and filtering system of claim 3, wherein said second filtering stage further comprises:

a fine filtering device for receiving said roughly-filtered machining liquid transferred from said first filtering tank;

a fine filtering tank for holding said finely-filtered machining liquid passed through said fine filtering device;

a high-pressure pump for supplying said finely filtered machining liquid through said first fluid return path; and

a liquid-adding pump for supplying said finely filtered machining liquid through said second fluid return path.

5. The flushing and filtering system of claim 1, wherein said first fluid return path is further configured so as to provide said finely filtered machining liquid to a guide bush, said guide bush having an end of said electrode disposed therethrough.

6. The flushing and filtering system of claim 1, wherein a bottom surface of said work tank is sloped so as to cause said residue-containing machining liquid to run toward an outlet proximate the bottom of said work tank.

7. The flushing and filtering system of claim 1, wherein said machining liquid is a dielectric material.

8. The flushing and filtering system of claim 1, wherein said machining liquid is an electrolyte material.

9. The flushing and filtering system of claim 4, further comprising a pressure sensor within said first fluid return path.

10. The flushing and filtering system of claim 1, wherein said work tank is configured to keep said workpiece completely submerged within said machining fluid.

11. The flushing and filtering system of claim 5, wherein work tank is further configured to spray machining fluid on exterior surfaces of said guide bush and said workpiece.

12. The flushing and filtering system of claim 11, further comprising a nozzle configured for spraying machining fluid on said exterior surfaces of said guide bush and said workpiece, said nozzle included within said second fluid return path.

13. A method for flushing and filtering an electroerosion machine, comprising:

passing a residue-containing machining liquid through a first filtering stage for roughly filtering said residue-containing machining liquid, said residue-containing liquid exiting from a work tank configured to maintain a workpiece therein;

passing roughly-filtered machining liquid exiting from said first filtering stage into a second filtering stage for fine filtering of said roughly-filtered machining liquid;

returning finely-filtered machining fluid to said work tank through a first fluid return path, said first fluid return path comprising a high-pressure return path for introducing said finely-filtered machining fluid through an electrode included in the electroerosion machine; and

returning said finely-filtered machining fluid to said work tank through a second fluid return path, said second fluid return path introducing said finely-filtered machining fluid through a liquid adding inlet directly connected to said work tank.

15. The method of claim 13, wherein said first filtering stage further comprises:

a rough filtering device for receiving residue-containing machining liquid exiting from said work tank;

a first filtering tank for holding said roughly-filtered machining liquid passed through said rough filtering device; and

a rough filtering pump for transferring said roughly-filtered machining liquid from said first filtering tank to said second filtering stage.

16. The method of claim 15, wherein said second filtering stage further comprises:

a fine filtering device for receiving said roughly-filtered machining liquid transferred from said first filtering tank;

a fine filtering tank for holding said finely-filtered machining liquid passed through said fine filtering device;

a high-pressure pump for supplying said finely filtered machining liquid through said first fluid return path; and

a liquid-adding pump for supplying said finely filtered machining liquid through said second fluid return path.

17. The method of claim 13, wherein said first fluid return path is further configured so as to provide said finely filtered machining liquid to a guide bush, said guide bush having an end of said electrode disposed therethrough.

18. The method of claim 13, wherein a bottom surface of said work tank is sloped so as to cause said residue-containing machining liquid to run toward an outlet proximate the bottom of said work tank.

19. The method of claim 13, wherein the electroerosion machine includes a dielectric material passed through a gap between the tool electrode and workpiece.

20. The method of claim 13, wherein the electroerosion machine includes an electrolyte passed through a gap between the tool electrode and workpiece.

21. The method of claim 16, further comprising a pressure sensor within said first fluid return path.

22. The method of claim 13, wherein said work tank is configured to keep said workpiece completely submerged within said machining fluid.

23. The method of claim 13, wherein said work tank is further configured to spray machining fluid on exterior surfaces of said guide bush and said workpiece.

24. The method of claim 23, further comprising spraying said machining fluid on said exterior surfaces of said guide bush and said workpiece through a nozzle, said nozzle included within said second fluid return path.

**IX. EVIDENCE APPENDIX**

No evidence pursuant to 37 C.F.R. §§ 1.130, 1.131, or 1.132 is/are entered by the Examiner. Accordingly, no evidence is/are relied upon by the Appellant in this paper.

## X. RELATED PROCEEDINGS APPENDIX

No related proceedings pursuant to 37 C.F.R. § 41.37(c)(1)(ii) is/are entered by, relied upon, or submitted by the Appellant with this paper.